We'll be starting in just a few minutes….

Tell us…

What topics are you interested in for future

Peer Exchange calls?

Please send your response to the call organizers via the question box.

Better Buildings®
U.S. DEPARTMENT OF ENERGY

Better Buildings Residential Network
Peer Exchange Call Series

Secrets from the Most Successful Residential Efficiency Programs

February 10, 2022

U.S. DEPARTMENT OF ENERGY

Agenda and Ground Rules

- Agenda Review and Ground Rules
- Opening Poll
- Residential Network Overview and Upcoming Call Schedule
- Featured Speakers
  - **Scott Sklar,** The Stella Group, Ltd.
  - **Rohini Srivastava,** ACEEE
- Open Discussion
- Closing Poll and Announcements

Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.
2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

The views expressed by speakers are their own, and do not reflect those of the Dept. of Energy.

Join the Network

Member Benefits:

- Recognition in media, social media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- One-on-One brainstorming conversations

Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year, or equivalent.

Upcoming Calls (2nd & 4th Thursdays):

- *2/24: It's Not About Energy, It's About Comfort – Addressing the Reality*
- *3/10: Are you ready? Preparing Homes for Extreme Weather*
- *3/24: All Things Ductless – Everything You Wanted to Know But Didn't Know to Ask*

Peer Exchange Call summaries are posted on the Better Buildings website a few weeks after the call

For more information or to join, for no cost, email bbresidentialnetwork@ee.doe.gov, or go to energy.gov/eere/bbrn & click Join

Rohini Srivastava
ACEEE

U.S. DEPARTMENT OF ENERGY

Pathways to Deep Energy Reduction

Strategies for Increasing Savings and Meeting Consumer Needs

Better Buildings Residential Network Webinar

Secrets from the Most Successful Residential Efficiency Programs

February 10, 2022

Rohini Srivastava

The American Council for an Energy-Efficient Economy is a nonprofit 501(c)(3) founded in 1980. We act as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors.

Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

Our work is made possible by foundation funding, contracts, government grants, and conference revenue.

aceee.org @ACEEEdc

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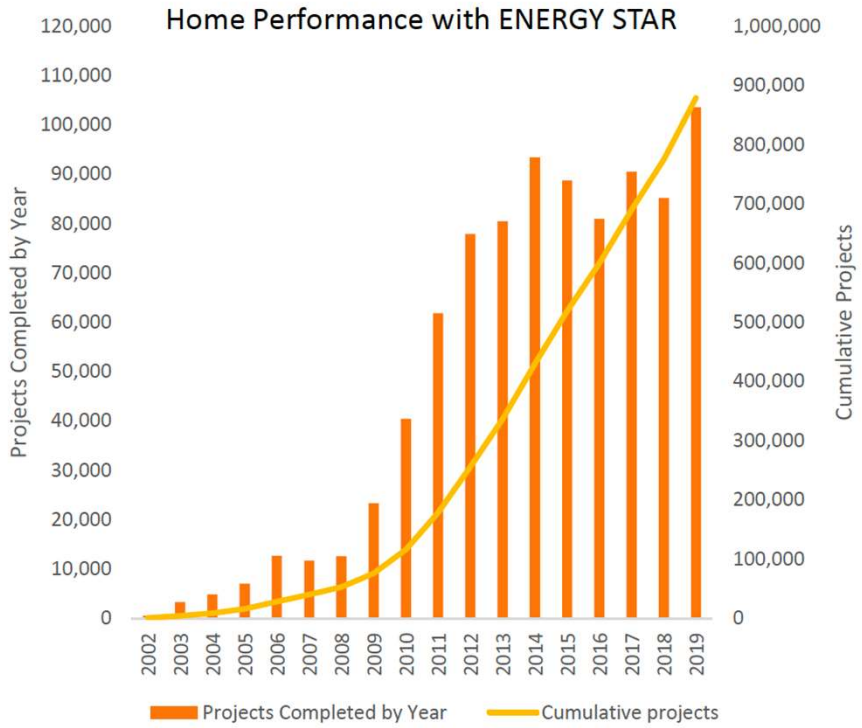
Retrofit packages and approaches need to expand the depth and breadth of home retrofits

- Existing programs and approaches fall short of what's needed
  - Relatively high project and program delivery cost
  - Technically complex
  - Average 25% savings per project
  - Limited consumer demand
- New approaches, could
  - Leverage non-energy benefits and behavioral strategies
  - Maximize near-term savings while advanced approaches are in development
  - Include electrification as appropriate
  - Increase consumer appeal



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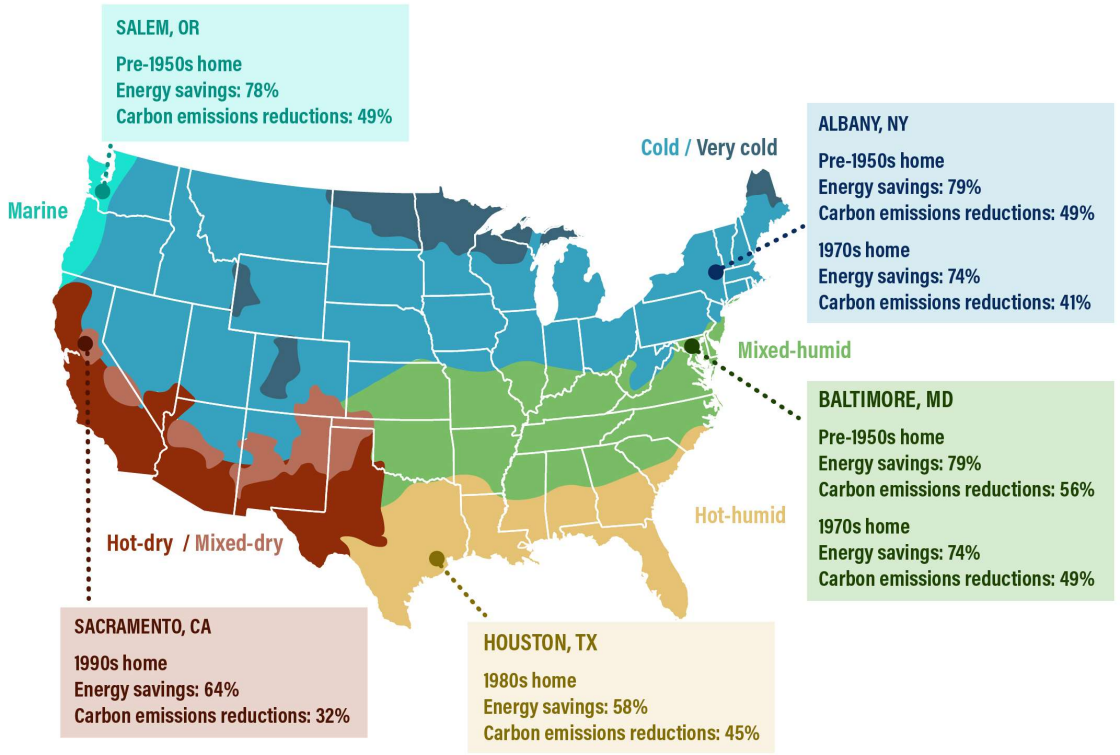
Effective strategies for designing retrofit programs

- Standardize retrofit packages
- Incorporate low-cost measures
- Stage retrofits
- Couple electrification with deep retrofit projects
- Offer financing and incentives
- Other strategies

Standardizing retrofit packages

- Ensure significant savings
- Reduce the time, cost, and inconvenience
- Combine more visible (and desirable) measures



Adapted from the Department of Energy's Building America Climate Zone Map

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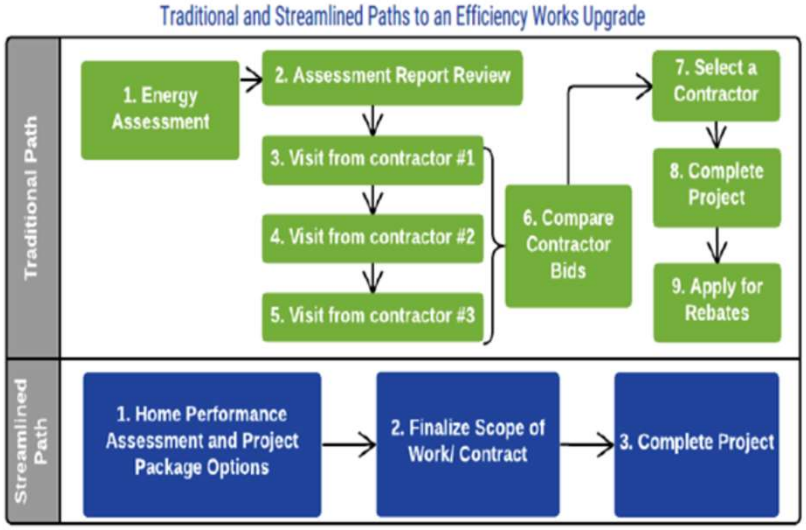
City of Fort Collins Utilities – Efficiency Works Program

- Launched in 2015
- 3 packages for whole-home efficiency measures with standardized pricing
- Recruit participants using targeted and tailored communications
- Qualified contractors complete the projects
- 2018 program data shows total savings of 9,543 kWh per year per household
- Average savings per home of 750 kWh of electricity and 300 therms of natural gas

Good	Better	Best
Seal and Insulate Attic and Rim Joist	Seal and Insulate Attic and Rim Joist and Insulate Walls and Floors	Seal and Insulate Attic and Rim Joist, Insulate Walls and Floors, and Retrofit Windows to ENERGY STAR
Incentive: $1,000*	Incentive: $2,500*	Incentive: $4,000*



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Incorporating low-cost measures

- Reduce energy use and emissions while improving comfort
- Lower total project costs
- Alternatives to traditional measures addressing heating, cooling, water heating, and lighting
  - E.g., storm windows, cellular shades, ceiling fans
- Supplemental measures that save energy in other end-use categories
  - E.g., consumer electronics

Storm windows

Tub Spout diverter (TSD)

Set-top box alternatives

Delivery of high-efficiency solutions

- Some measures are better suited to particular climates or housing types (e.g., dehumidifiers)
- Work required to incorporate high-efficiency alternatives in utility programs
- Utility marketplaces, contractors, and in-store rebates for direct- install measures

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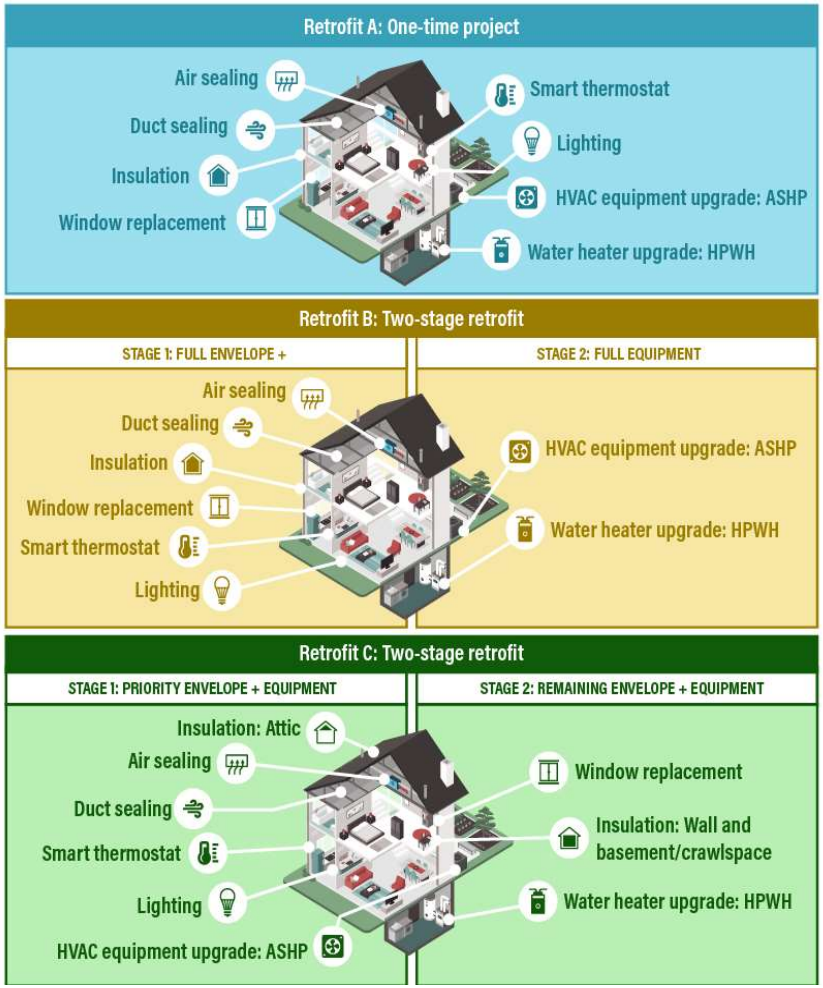
Staging retrofits

- Splitting into stages can make the process less overwhelming
- Allows homeowners to tackle immediate needs first
- Ongoing engagement to support completion of the full retrofit over time



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New York State Energy Research and Development Authority - Comfort Home Pilot

- Launched in 2019 in select markets
- Offers customers four standard load-reduction packages
- An additional incentive for a heat pump if installed within 12 months a home load-reduction package
- Uses geo-targeting analysis to recruit participants
- Qualified contractor helps select the improvement package and available rebates and financing
- 2020 program data shows, 23 signed contracts, of which, 12 projects installed

Three tiers of load reduction packages*

** Dollar amounts shown reflect incentive amounts, total package costs to be discussed with contractor*

Tier Level	Description	Cost
★ Basic	Air and duct sealing + duct insulation	$500
★★ Good	Air and duct sealing + duct insulation + insulate attic and rim joist	$1,000
★★★ Better	Air and duct sealing + duct insulation + insulate attic and rim joist + insulate walls + insulate floor	$2,500
★★★★ Best	Air and duct sealing + duct insulation + insulate attic and rim joist + insulate walls + insulate floor + Energy Star® windows	$4,000

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

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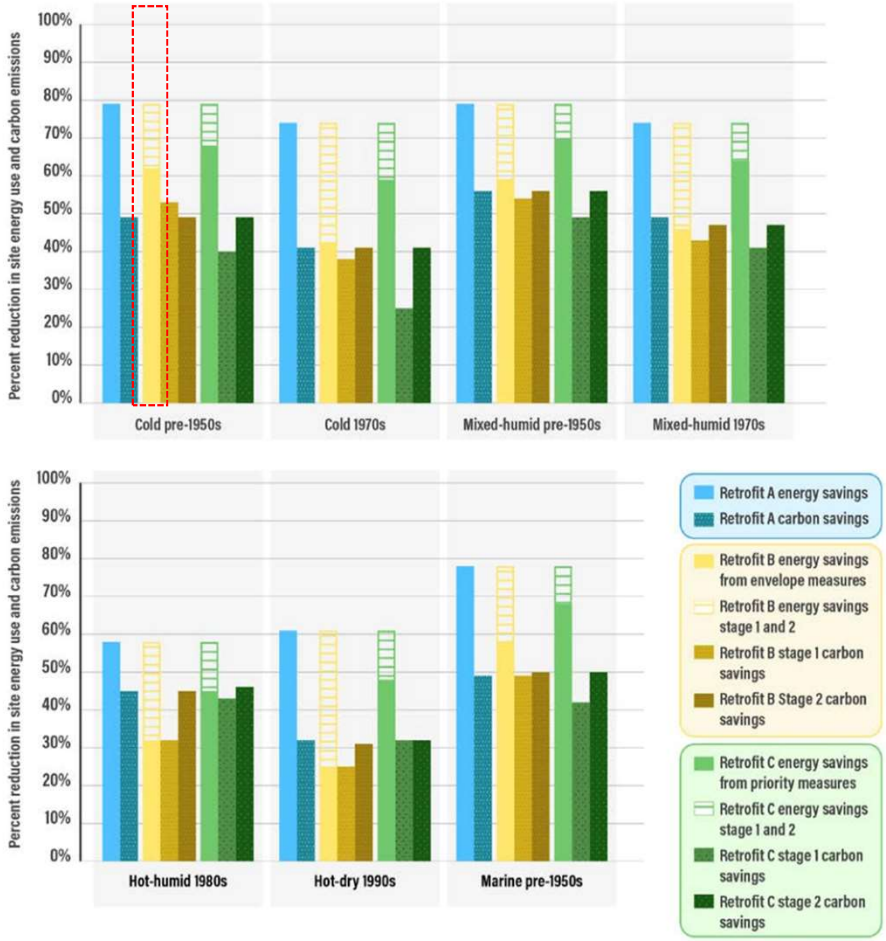
Coupling electrification with deep retrofit projects

- Maximizes emissions reductions and improve overall home performance
- Reduces cost of electrification where natural gas is cheaper
- Facilitates the transition to a decarbonized building stock



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Zero Energy Now Pilot Program, Vermont

- Launched in 2016 by Building Performance Professionals Association of Vermont, funded through Green Mountain Power
- Offers a combination of weatherization measures, heat pumps, and rooftop solar
- A contractor guides the homeowner on which efficiency measures to implement
- Access to affordable financing to help reduce the upfront costs.
- 35 projects completed
- Data from 24 homes reveals average home energy savings of 39% and fossil fuel and grid electric savings averaging 64%

Thousands of $$ in Incentives Now Available

On a first-come, first-serve basis and for a limited time, participants in *Zero Energy Now* can receive substantial incentives and tax credits, depending on the combination of improvements. The Zero Energy Now coordinators can review all of the incentive opportunities with you, but the major ones include:

- **Zero Energy Now – up to $5,000 depending on the energy saved – all projects must be completed by 12/31/2022**
- **For income-eligible homeowners, another $3,000 is available (for the first ten participants!)**
- **Federal tax credit**
  - **A 26% of project cost tax credit** for installing solar panels
- **Efficiency Vermont opportunities[1], including:**
  - **Rebates on home weatherization**
  - **Rebates for high-efficiency equipment**
  - **Low or 0% interest financing**
- **Additional incentives may be available, depending on your electric utility**
- **Fantastic financing is available right now with great, low rates**
  - **Visit https://www.efficiencyvermont.com/services/financing/homes/home-energy-loan to learn more**
- **A free electric vehicle (EV) charging station for the first 10 participants!**

Let's Make it Official

The *Zero Energy Now* Program offers an official label and designation as a *Zero Energy Now* participant for homes that meet the "10-50-50" standards as defined below:

- 10: At least a 10 percent reduction in envelope heat loss;
- 50: At least a 50 percent reduction in combined fossil fuel and grid electricity;
- 50: At least 50 percent of the building's total post-project energy load is derived from renewable electric, biomass, or other recognized renewable sources.

If your home doesn't meet the customized "10-50-50" Zero Energy Now approach, it may meet the Zero Energy Now checklist approach. Call to find out more!

Ready to start saving?

To get started, send us an email at info@zeroenergynowvt.com or give us a call at 802-825-9515.

Visit the *Zero Energy Now* website at http://zeroenergynowvt.com for more information on standards, eligibility, incentives, and success stories from past *Zero Energy Now* projects!

Building Performance Professionals Association of Vermont
BPPA-VT
Vermont's Authorities on Energy Efficiency
PO Box 8125, Brattleboro, VT 05304 • 802-522-4677 • www.BPPA-VT.org

[1]Go to https://www.efficiencyvermont.com/rebates for current promotional offers
[2]All consumption and reductions shall be measured in MMBtu/year.

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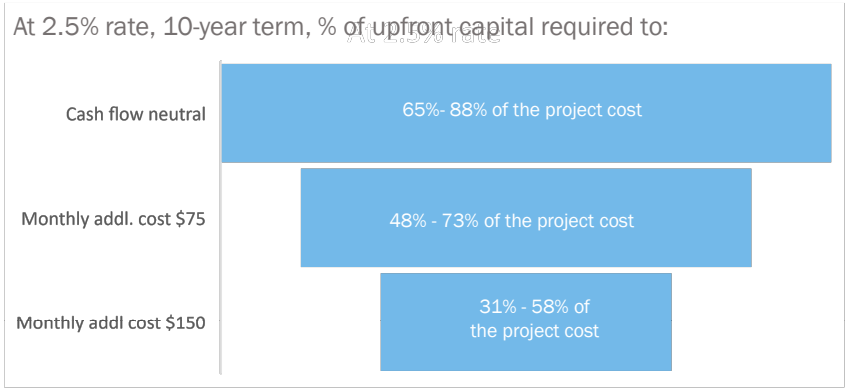
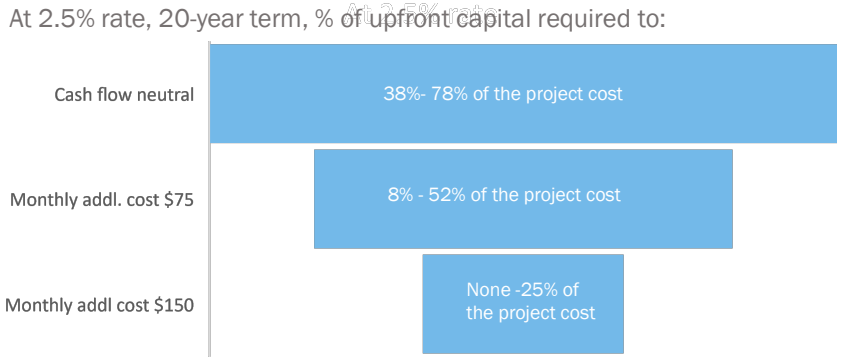
Offering financing and incentives

- Affordable financing approaches and incentives can help reduce the cost barrier.
- Help lock in the full project
- Encourage homeowners who split the deep retrofit project into phases to follow through with later stages





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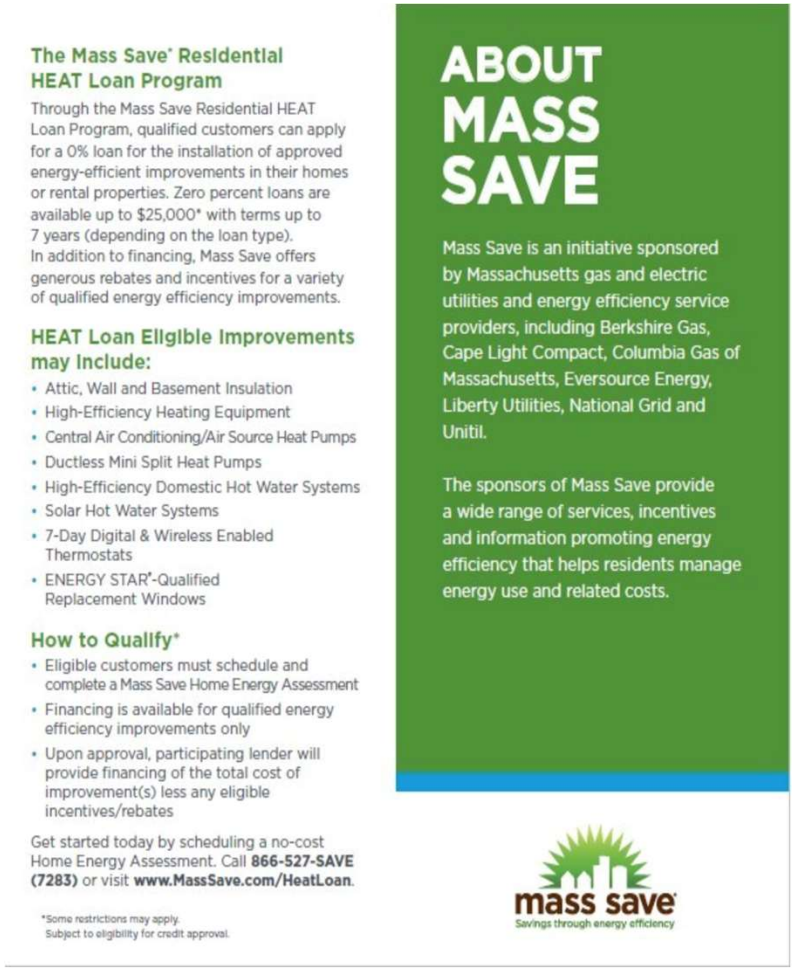
Mass Save HEAT Loan Program

- Collaboration among Massachusetts's utilities - Berkshire Gas, Cape Light Compact, Eversource, Liberty Utilities, National Grid, and Unitil
- Interest-free financing for eligible customers
- Loans for home energy efficiency upgrades, including heating and water heating equipment, central A/C and heat pumps, and insulation.
- Varies between $500 and $25,000 with terms of up to 7 years
- Largest ratepayer-funded utility energy efficiency lending program in the country
- In 2019, issued 13,443 loans at an average amount of $11,675



The Mass Save® Residential HEAT Loan Program

Through the Mass Save Residential HEAT Loan Program, qualified customers can apply for a 0% loan for the installation of approved energy-efficient improvements in their homes or rental properties. Zero percent loans are available up to $25,000* with terms up to 7 years (depending on the loan type). In addition to financing, Mass Save offers generous rebates and incentives for a variety of qualified energy efficiency improvements.

HEAT Loan Eligible Improvements may Include:

- Attic, Wall and Basement Insulation
- High-Efficiency Heating Equipment
- Central Air Conditioning/Air Source Heat Pumps
- Ductless Mini Split Heat Pumps
- High-Efficiency Domestic Hot Water Systems
- Solar Hot Water Systems
- 7-Day Digital & Wireless Enabled Thermostats
- ENERGY STAR®-Qualified Replacement Windows

How to Qualify*

- Eligible customers must schedule and complete a Mass Save Home Energy Assessment
- Financing is available for qualified energy efficiency improvements only
- Upon approval, participating lender will provide financing of the total cost of improvement(s) less any eligible incentives/rebates

Get started today by scheduling a no-cost Home Energy Assessment. Call **866-527-SAVE (7283)** or visit **www.MassSave.com/HeatLoan**.

*Some restrictions may apply. Subject to eligibility for credit approval.

ABOUT MASS SAVE

Mass Save is an initiative sponsored by Massachusetts gas and electric utilities and energy efficiency service providers, including Berkshire Gas, Cape Light Compact, Columbia Gas of Massachusetts, Eversource Energy, Liberty Utilities, National Grid and Unitil.

The sponsors of Mass Save provide a wide range of services, incentives and information promoting energy efficiency that helps residents manage energy use and related costs.

mass save
Savings through energy efficiency

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Other strategies

- Establish a single program/project point of contact for the customer
- Provide post-project follow-up with the customer
- Leverage remodeling and other projects/transactions
- Market the multiple benefits of efficiency and decarbonization
- Update and expand direct-install measure offerings
- Incorporate smart features to improve project outcomes
- Integrate with other program offerings including marketplace and behavior program offerings

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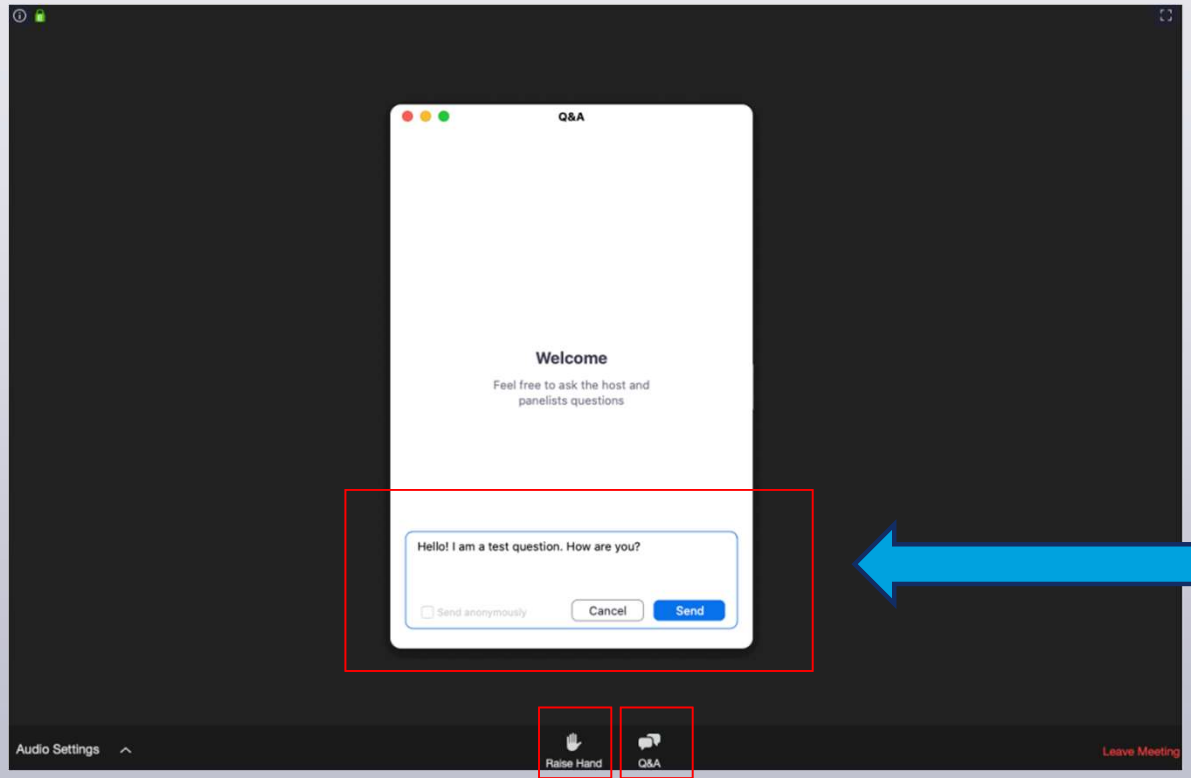
American Council for an Energy-Efficient Economy

Thank you!

Rohini Srivastava, PhD
rsrivastava@aceee.org
Senior Researcher, Buildings Program

Discussion: Share Your Questions



Please use the **questions box** to submit questions, comments, or alert us of technical difficulties

Raise your hand to enter the discussion

Open and close your **Q&A window** here

Scott Sklar
The Stella Group, Ltd

U.S. DEPARTMENT OF ENERGY

The Stella Group, Ltd.

The Stella Group, Ltd.. is a strategic technology optimization and policy firm for clean distributed energy users and companies which include advanced batteries and controls, energy efficiency, fuel cells, geoexchange, heat engines, microhydropower (including tidal and wave), modular biomass, photovoltaics, small wind, and solar thermal (including CSP, daylighting, water heating, industrial preheat, building air-conditioning, and electric power generation). The Stella Group, Ltd. blends distributed energy technologies, aggregates financing with a focus on system standardization. Scott Sklar sits on the national Board of Directors of the non-profit Business Council for Sustainable Energy and, teaches three unique interdisciplinary sustainable energy courses at The George Washington University. Sklar is the Sustainable Energy Director at GWU's Environment and Energy Management Institute (EEMI). He gives weekly tours of his two self-powered buildings in Arlington,Virginia.

Scott Sklar, President, The Stella Group, Ltd.

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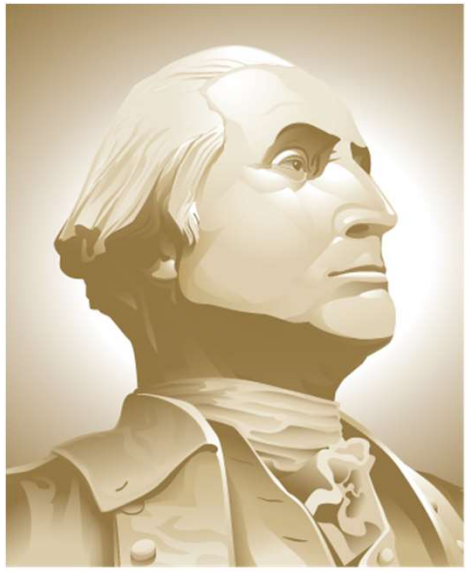

THE GEORGE WASHINGTON UNIVERSITY

WASHINGTON, DC

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Energy Director
Environment & Energy Management Institute (EEMI)
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RESILIENT BUILDINGS ENERGY STORAGE

Scott Sklar

USDOE

February, 2022

OVERVIEW

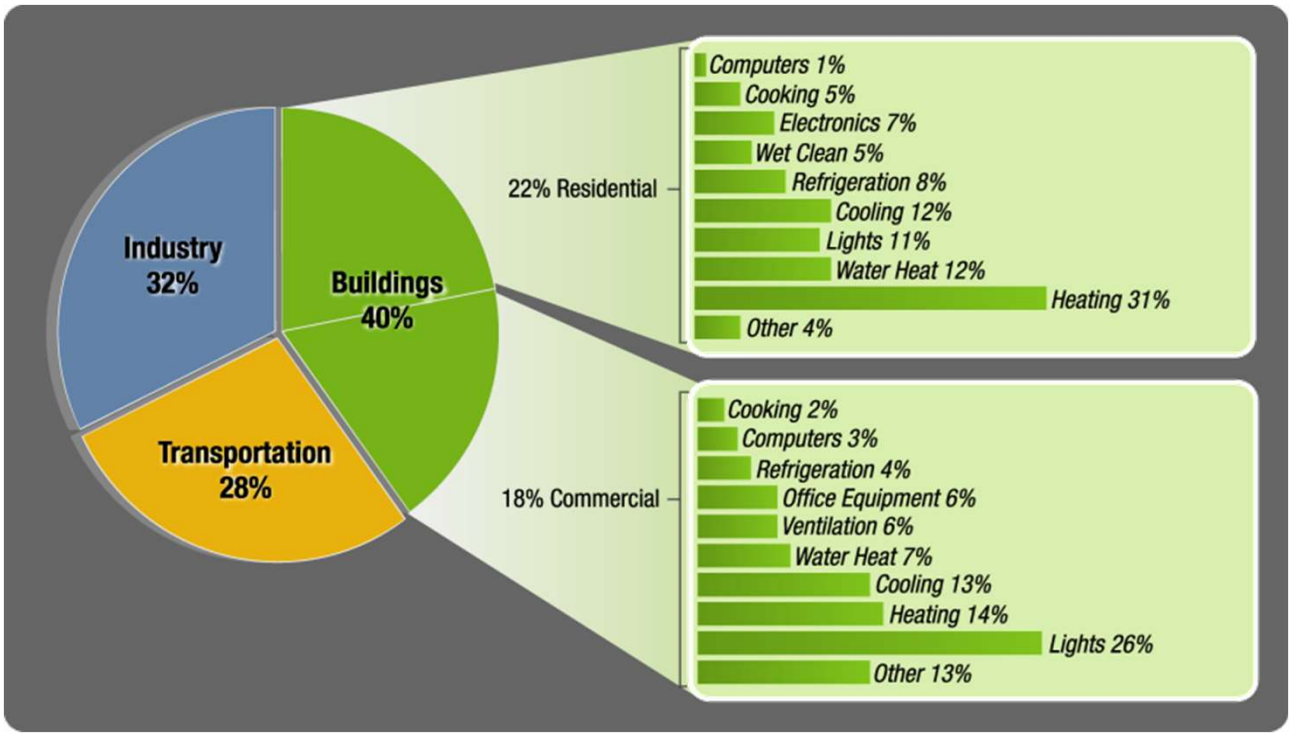
Net-Zero Building Commitments Are Adding Up:
GreenBiz.com, by Jesse Klein, July 9, 2020

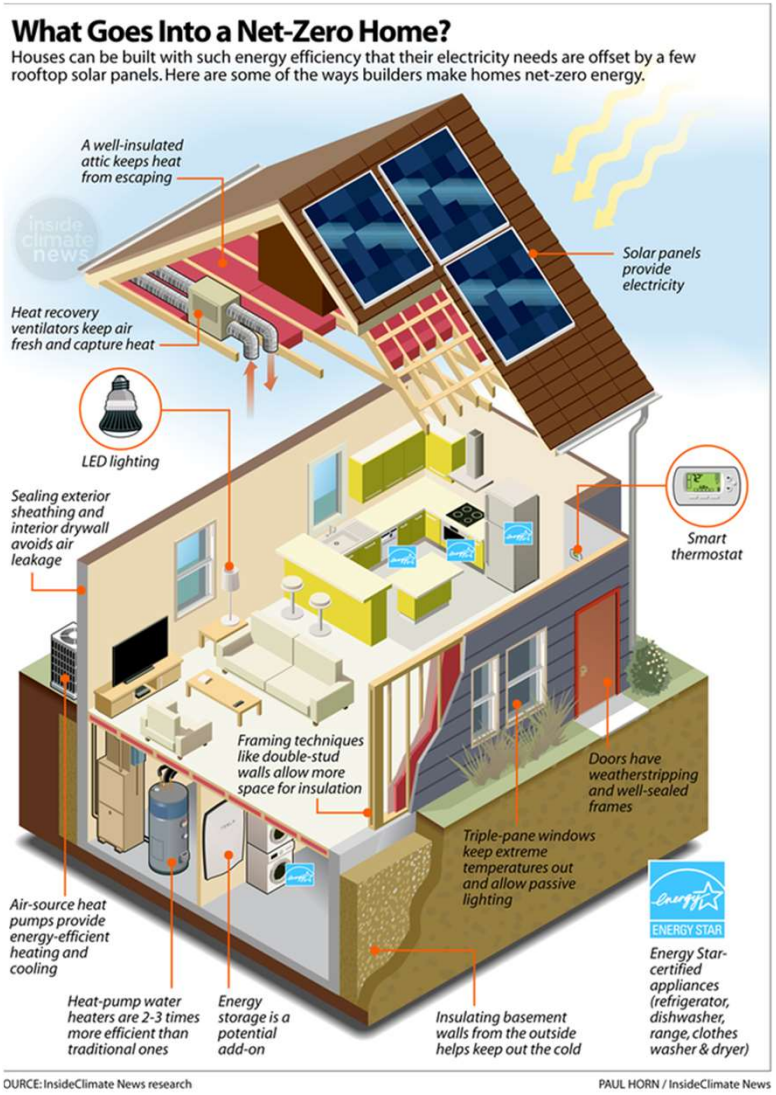
https://www.greenbiz.com/article/those-net-zero-building-commitments-are-adding

There are 1 billion buildings in the world, and that footprint will double by 2060. It is difficult to know how many buildings are operating at net-zero because some buildings are operating at net-zero because of the renewable energy supplied by the grid. But officially, ninety-five businesses, 28 cities and six states have signed on to a World Green Building Council initiative by committing to make all their buildings net-zero carbon-emitting by 2030 or sooner. California has signed onto the commitment with 16 million buildings, along with businesses such as design firm Atelier Ten, healthcare real estate investment trust Assura and retail center developer Wereldhave. Each organization pledging to support the WGBC initiative must commit to a net-zero building goal, disclose annual energy demand and carbon emissions for its portfolio, create a concrete action plan and have a third party perform a verification of the data and the strategy.

Why Net Zero is Important

- Buildings are the Largest Energy Consumer in the U.S.
  - 40% of primary energy, 72% of electricity, 55% of natural gas





https://insideclimatenews.org/news/10122018/net-zero-energy-efficiency-home-infographic-solar-pay-off-years-midwest-detroit-chicago-columbus?utm_source=InsideClimate+News&utm_campaign=f32d6f74ec-&utm_medium=email&utm_term=0_29c928ffb5-f32d6f74ec-327493849

RISK – State of Play 2022. - Professor Sklar

We have had three recent mega-grid failures:

- Puerto Rico (hurricanes, 3) 2017
- California (forest fires) 2020
- Texas (extreme cold) 2021

The basic approach for continuity of operations are diesel engines:

- during these events, cannot deliver diesel fuel
- during these events, cannot repair diesel engines
- during these events, cannot handle start-up surges
- natural gas pipelines can freeze (TX)

On-site battery banks, which have dropped 61%, and will decrease another 21% over the coming three years. They are active every day - saving energy in good times and powering electric loads in bad times. They can be charged by multiple sources: waste heat, solar, wind, biogas, propane, legacy diesels, free flow hydro …….

Building Electrification: Programs and Best Practices Report
February 3, 2022
American Council for an Energy Efficient Economy (ACEEE)

Building electrification—reducing greenhouse gas emissions from direct fossil fuel use in buildings—is vital to mitigating climate change. Across the United States, utilities, cities, states, and non-profit groups are offering programs and incentives to electrify space heating, water heating, and other end uses. This report assesses the state of building electrification today by profiling 42 building electrification programs across the country. We summarize current approaches and program characteristics, including the strategies program administrators use to reach customers; program budgets and participation levels; and the extent to which these programs integrate weatherization, energy efficiency, solar, battery storage, and demand response.

REPORT: https://www.aceee.org/research-report/b2201

TRENDS

Buildings are huge sources of load flexibility, but what's that worth to utilities? DOE investigates
by Robert Walton **Published** May 5, 2020

Buildings account for 75% of U.S. electricity consumption and up to 80% of peak demand, according to new research from Lawrence Berkeley National Laboratory (LBNL), supported by the U.S. Department of Energy's Grid-interactive Efficient Buildings (GEB) Initiative.

Their electricity demand means buildings also represent the largest source of load flexibility on the electric grid, though researchers say utilities need to properly value that flexibility in order to fully engage them as energy resources. The first step is to account for all electric utility system economic impacts resulting from demand flexibility, according to report lead author Tom Eckman, a consultant to LBNL. That includes the value of energy efficiency, demand response, and distributed energy resources' (DERs) abilities to generate power, shed and shift load, and modulate their electricity demand.

While buildings have the potential to act as flexible grid resources, LBNL's report highlights the complexity of the value proposition because "there is no single economic value of demand flexibility for utility systems." "Because they have so many adjustable loads, buildings represent the largest source of demand flexibility, so they can be part of the solution to peak demand issues and offer a broader range of grid services to help meet other electricity system requirements," according to Lisa Schwartz, LBNL's deputy leader of the electricity markets and policy group.

The Brattle Group last year estimated that in 2030 cost-effective load flexibility potential in the United States could reach 198 GW, much of it coming from buildings, and capable of delivering more than $16 billion in annual savings.

SOURCE: https://www.utilitydive.com/news/buildings-are-huge-sources-of-load-flexibility-but-whats-that-worth-to-ut/577348/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202020-05-06%20Load%20Management%20Weekly%20%5Bissue:27170%5D&utm_term=Utility%20Dive:%20Load%20Management

Newly Released FEMA Study Shows Value of Adopting Modern Building Codes
Thu, Dec 17, 2020 3:20 PM

In November, FEMA published Building Codes Save: A Nationwide Study of Loss Prevention, which highlights and reveals the high value of adopting and enforcing International Codes for hazard mitigation as a return on investment.

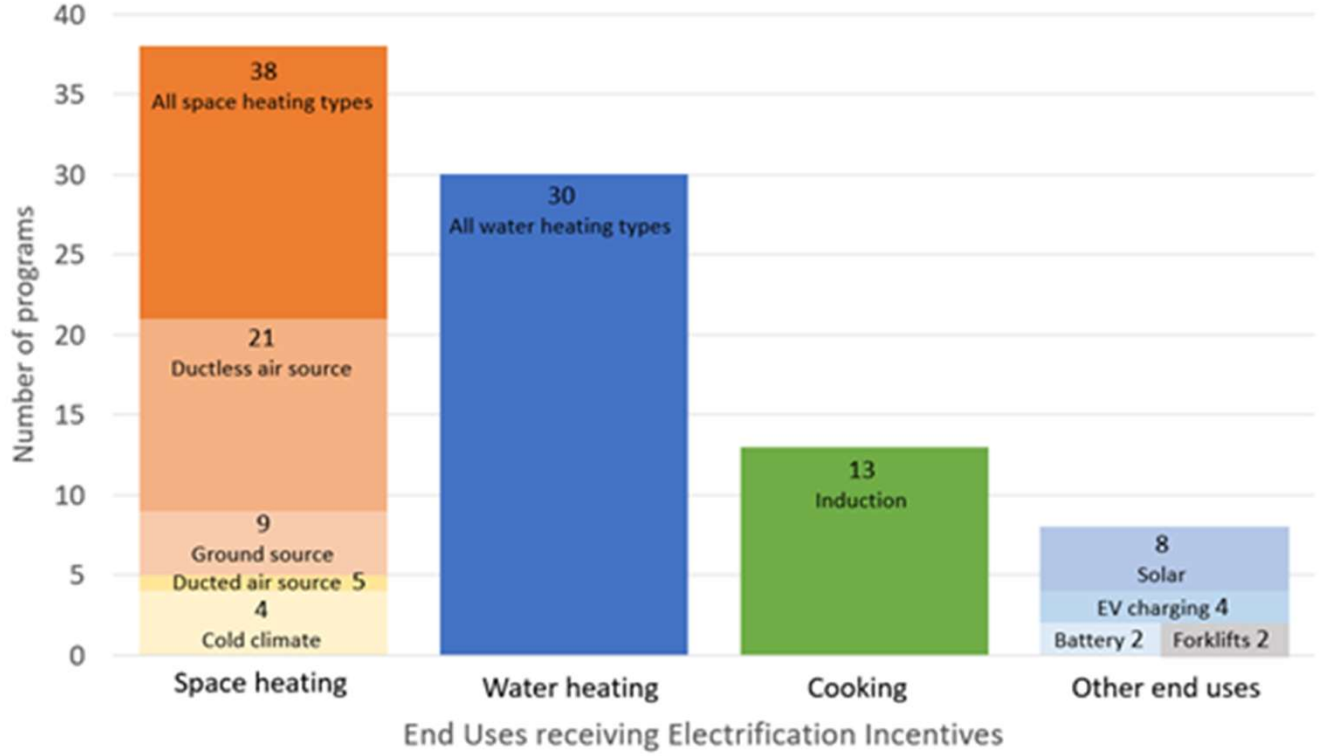
Since the first edition of the International Codes in 2000, communities adopting higher building code standards saved the nation approximately $1.6 billion in average annualized losses from flooding, hurricanes and earthquakes. Additionally, the study shows that over a 20-year period, communities with modern building codes would avoid at least $132 billion in losses from natural disasters. These figures do not account for the cascading effects of damaged homes and businesses, which can further increase losses significantly.

A 12-page summary, Protecting Communities and Saving Money – The Case for Adopting Building Codes, as well as the full-study detailing this project—its methodology, results and conclusions—are available on FEMA's website**.**

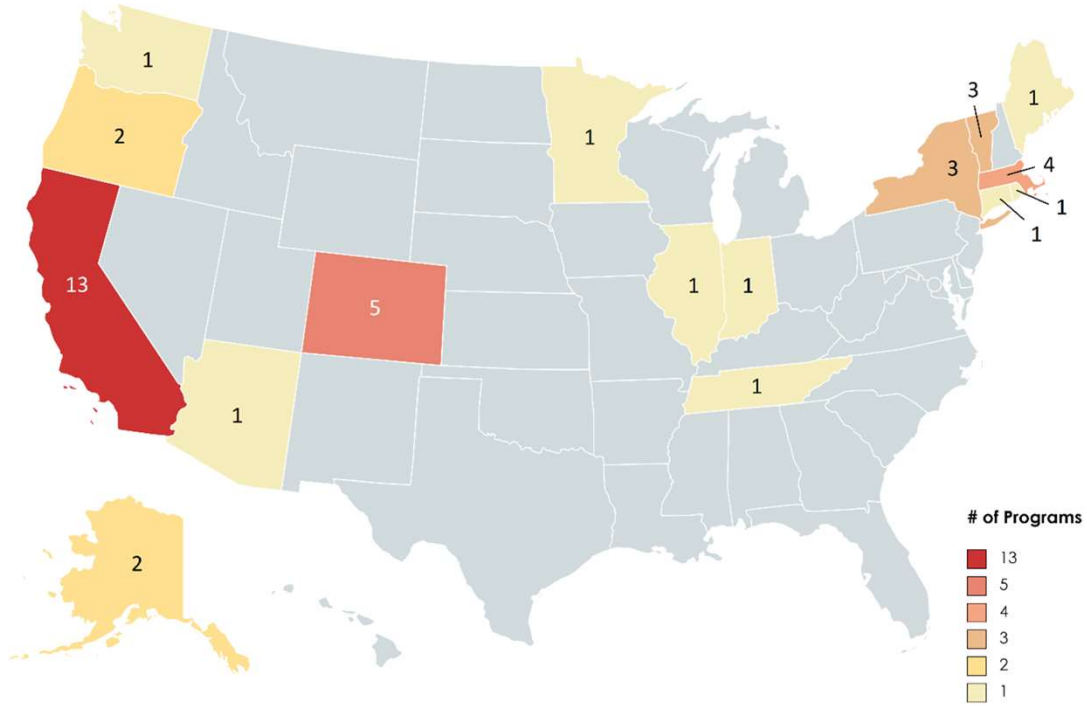
https://www.fema.gov/sites/default/files/2020-11/fema_building-codes-save_brochure.pdf

Our report finds that most electrification efforts focus primarily on space heating and hot water, which together represent the two largest direct uses of fossil fuels and corresponding sources of GHG emissions in buildings in the United States.

Other measures are less common in the programs we surveyed. Replacing gas-fired stoves with electric induction ranges, for example, features in about a third of programs. Finally, more than half of the programs combine electrification with conventional energy efficiency and weatherization measures, a tried-and-true approach that can make electric heat even more cost-effective and achieve higher carbon reductions from reduced energy waste.

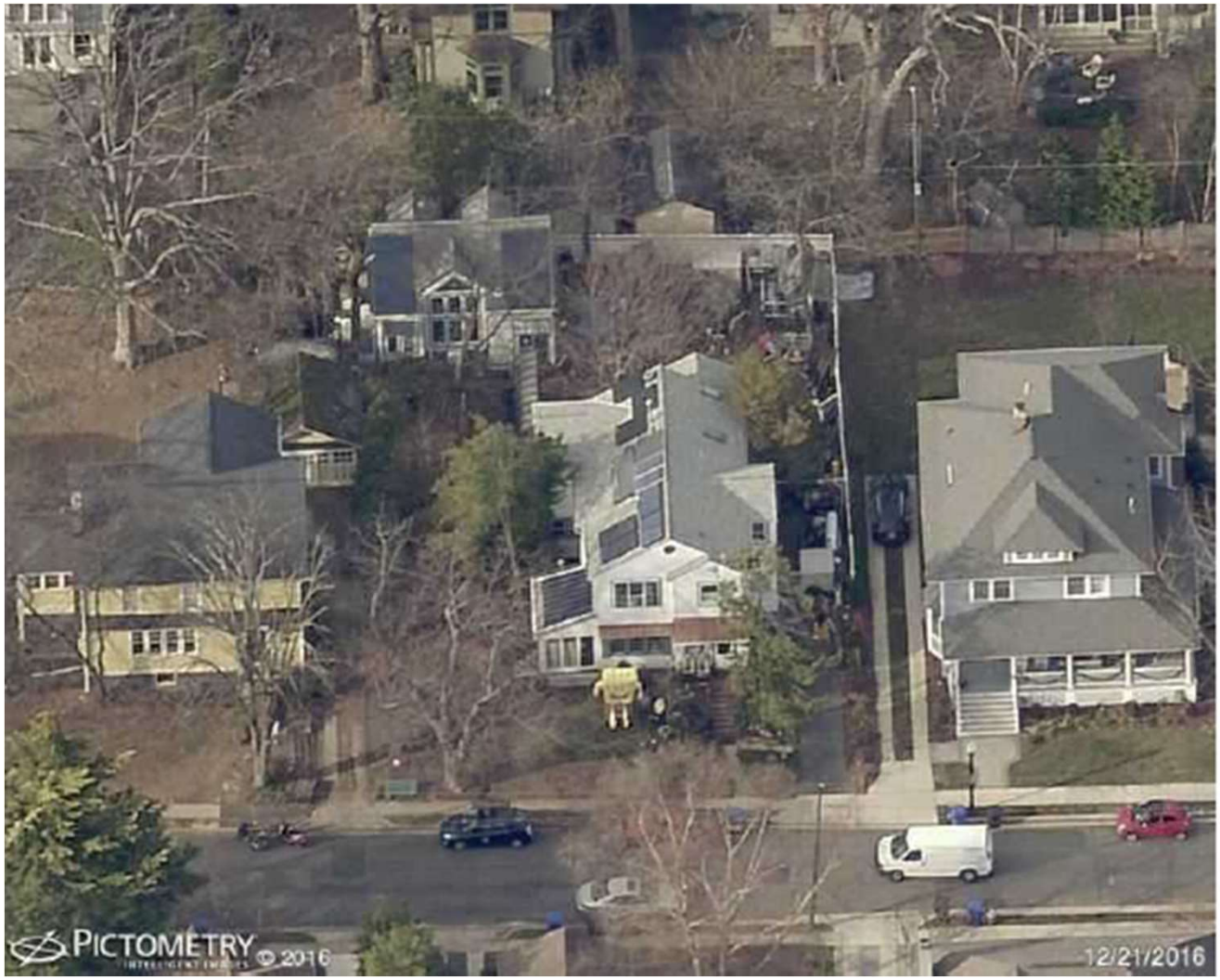


Our report analyzes 42 such programs in the residential, multifamily, and commercial sectors and identifies trends, common approaches, and best practices. Though these programs are mainly found in states with ambitious climate targets, such as California and New York, there are examples of electrification efforts in many states across multiple climates, regions, and political environments, as shown in the map below.



https://www.aceee.org/blog-post/2022/02/programs-electrify-buildings-are-heating-nationwide-report-shows

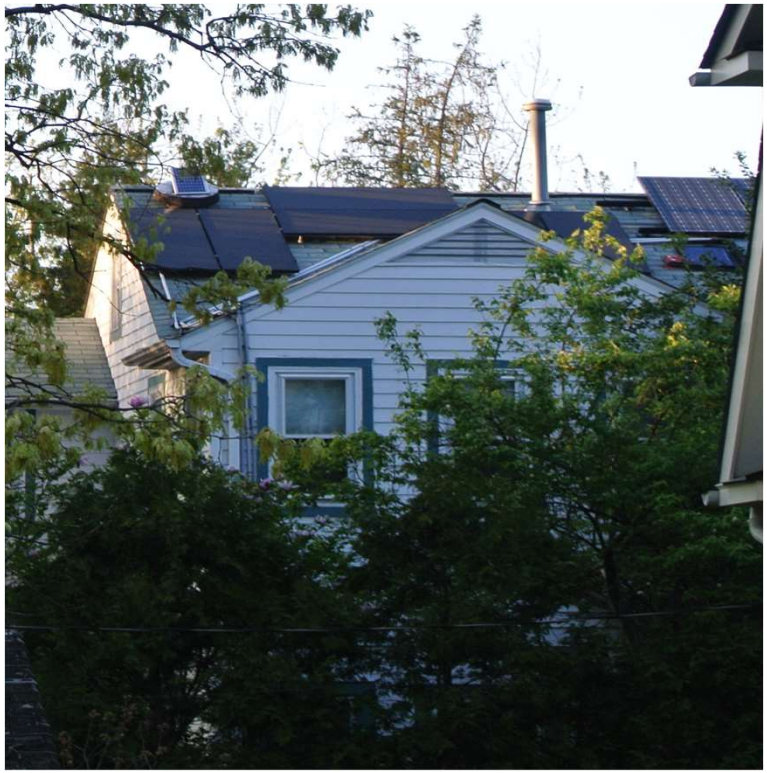
SKLAR EXAMPLES, ARLINGTON, VA



Eagle View: Sklar’s two zero energy buildings, Arlington, Virginia

StellaGp office building: R-50 insulation, super-insulating windows, solar daylighting, PV Driven ceiling fans, PV shingles, small wind turbine, hydrogen fuel cell all tied to a web-enabled battery bank

SKLAR ARLINGTON 1921 SEARS KIT HOME: R-38 insulation, low-e double-paned windows, thermal barrier paint under the attic roof, LEDs, Energy Star appliances, solar water heating, geothermal heating & cooling, PV with battery bank, electrochromic glass, LEDs, etc.



SKLAR HOUSE – SOUTH FACE (WEST SIDE OF ROOF)

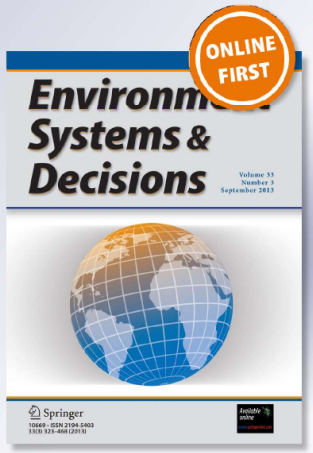
Perspective on multi-scale assets for clean energy technologies in buildings

Scott Sklar

Environment Systems and Decisions
Formerly The Environmentalist

ISSN 2194-5403

Environ Syst Decis
DOI 10.1007/s10669-013-9475-0



Springer

NET ZERO BUILDING #126
WASHINTON NAVY YARD (NAVFAC)

Mitigated 63,000kWh of electricity

SOLUTIONS & STRATEGIC DECISIONS

FEDERAL, STATE & LOCAL GOVERNMENTS: USA

1) Federal Tax Credits
   2020-22 : Owners of new residential and commercial solar can deduct **26 percent** of the installed cost of the photovoltaics and solar water heating systems from their taxes (including a battery bank if installed as an integral part of the PV system).

2) State Renewable Portfolio Standards
   Energy Efficiency Standards

3) State Net Metering (credit for excess electricity generation)
   Note: some states allow electric utilities to charge “Stand-by Charges”

4) State Energy Tax Credits or Tax Waivers

5) Building Codes & Stretch Codes (ie State of CA, Cities of Chicago, New York City, Washington, DC etc.

6) C-PACE/R-PACE (Commercial/Residential Property Assessed Clean Energy)

FOR RESILIENCY, WHAT SHOULD I POWER (PV-BATTERY) ??

In buildings – (focus: continuity of operations)

- WIFI and phone, security
- operating rooms in hospitals
- data centers within buildings
- sump pumps to prevent flooding
- at least one elevator shaft
- in certain climates - the HVAC systems to insure minimally-acceptable comfort is essential.

In communities –

- powering selected strip malls that are geographically dispersed that have
  - ATM machines
  - refrigeration for food
  - health care (eye, health, dental) to keep only the most critical care at to hospitals and non-critical away from hospitals
  - gasoline pump islands
  - schools as convergence points from displaced people of for first responders.

Note: For schools, we only powered the office, computer lab, kitchen and gymnasium (about a third of the overall energy) to make the facility usable

DECSION SLIDE #1: by SCOTT SKLAR

1) ENERGY EFFICIENCY

It is always is less expensive to save energy than generate it from any source of energy – whether that be coal, nuclear, natural gas or renewable energy

a. Insulation – the higher the R-Value, the better. R-18 to R-50 (roofs)
b. Lighting – LEDs and solar daylighting
c. Energy Efficient Appliances: Refrigerator, Washer/Dryer, HVAC system
d. Water Heater – super-insulated tank, solar water heater, heat pump water heater, waste heat water heater
e. HVAC – radiant and ductless systems are by far the most efficient, meaning they utilize less energy, and in most cases far healthier

2) RENEWABLE ENERGY as EFFICIENCY

a. Solar water heating
b. Solar daylighting
c. Geothermal heat pumps – either water or refrigerant (ductless)

DECSION SLIDE #2 by SCOTT SKLAR (2021)

ENERGY STORAGE

1. Do you want to own and take the tax credits ?
2. For now, need to pair with solar (see below)
   And if so, you want financing ?

2. Or do you want to just pay less per month for electricity thus using a lease, power purchase agreement PPA) , or energy performance service contract (EPSC) ?

3. Does your area experience frequent outages or weather ? Do you need continuity of operations for “ALL” or part of your building electric loads? If so, do you want energy storage ?

4. Do you have high electricity sub-rates – demand charges, peak & seasonal power rates, spot market or ratchet rates ?

Note: Dedicate to critical functions during an outage – such as WIFI, phone, security, sump pumps, refrigerator, some lighting, one-elevator Shaft, duct pumps, computers, a few electric outlets.

MONEY MAKES THE WORLD GO ROUND .....

ENERGY SYSTEMS NEED TO BE FINANCED – MOST DO NOT JUST GET PURCHASED, EXCEPT IN SOME RESIDENTIAL and COMMERCIAL PROJECTS – USUALLY BY WEALTHIER CUSTOMERS

SO WHAT ARE THE WAYS ???

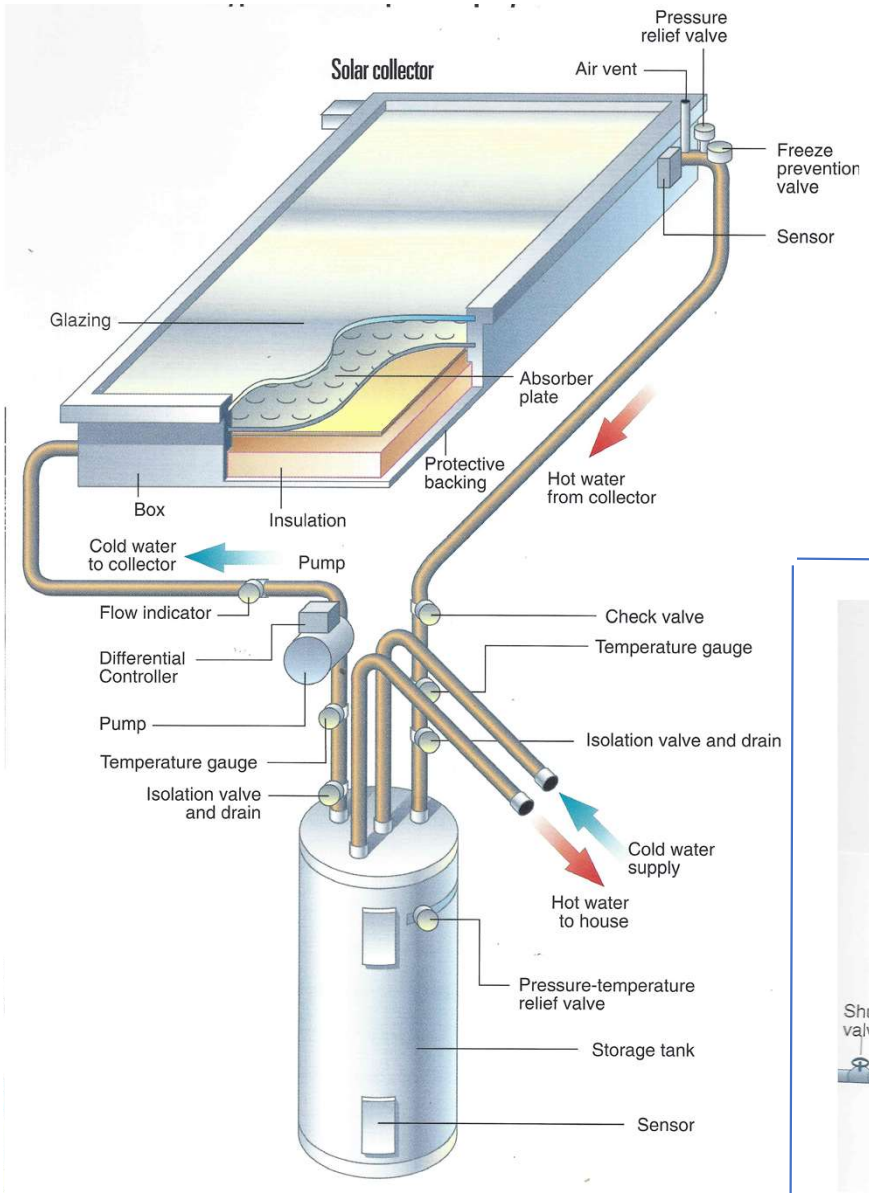
1. POWER PURCHASE AGREEMENTS – MEANING THE CUSTOMER SIGNS A LONG TERM CONTRACT FOR THE ELECTRICITY OR HEAT AND THE SELLER BORROWS MONEY OR ACCEPTS INVESTMENT TO BUILD, INSTALL & SERVICE THE PROJECT

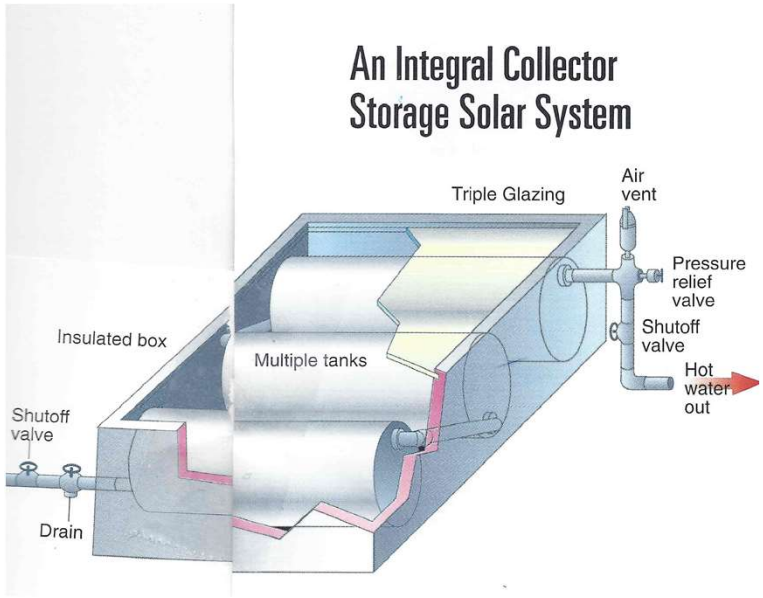
2. LEASING – BUYER LEASES AN ENERGY SYSTEM FROM 5 – 10 YEARS AND OWNER THEN TAKES THE SYSTEM, OR LESSOR CAN PURCHASE IT FOR IT'S "RESIDUAL VALUE"

3. SHARED SAVINGS – WHERE A PROVIDER SELLS & INSTALLS ENERGY EFFICIENCY OR RENEWABLE ENERGY AT THEIR COST, AND CHARGES THE CUSTOMER FOR HALF THE ENERGY SAVINGS, AND THEY USE THE OTHER HALF PAYMENT TO PAY LOAN AND OBTAIN THEIR PROFIT

TECHNOLOGY CHOICES

A Typical Active Closed-Loop System





How will this solar water collector perform?

SOLAR COLLECTOR CERTIFICATION AND RATING	CERTIFIED SOLAR COLLECTOR	
SRCC OG-100	SUPPLIER:	**Heliodyne, Inc.** 4910 Seaport Avenue Richmond, CA 94804 USA
	MODEL:	336 013
	COLLECTOR TYPE:	Gobi Glazed Flat-Plate
	CERTIFICATION#:	2007026A

COLLECTOR THERMAL PERFORMANCE RATING

Megajoules Per Panel Per Day				Thousands of BTU Per Panel Per Day			
CATEGORY (Ti-Ta)	CLEAR DAY	MILDLY CLOUDY	CLOUDY DAY	CATEGORY (Ti-Ta)	CLEAR DAY	MILDLY CLOUDY	CLOUDY DAY
A (-5 °C)	36.8	27.8	18.9	A (-9 °F)	34.9	26.4	17.9
B (5 °C)	33.1	24.1	15.2	B (9 °F)	31.4	22.9	14.4
C (20 °C)	27.6	18.8	10.1	C (36 °F)	26.2	17.8	9.6
D (50 °C)	17.3	9.3	2.1	D (90 °F)	16.4	8.8	2.0
E (80 °C)	7.8	1.7	0.0	E (144 °F)	7.4	1.6	0.0

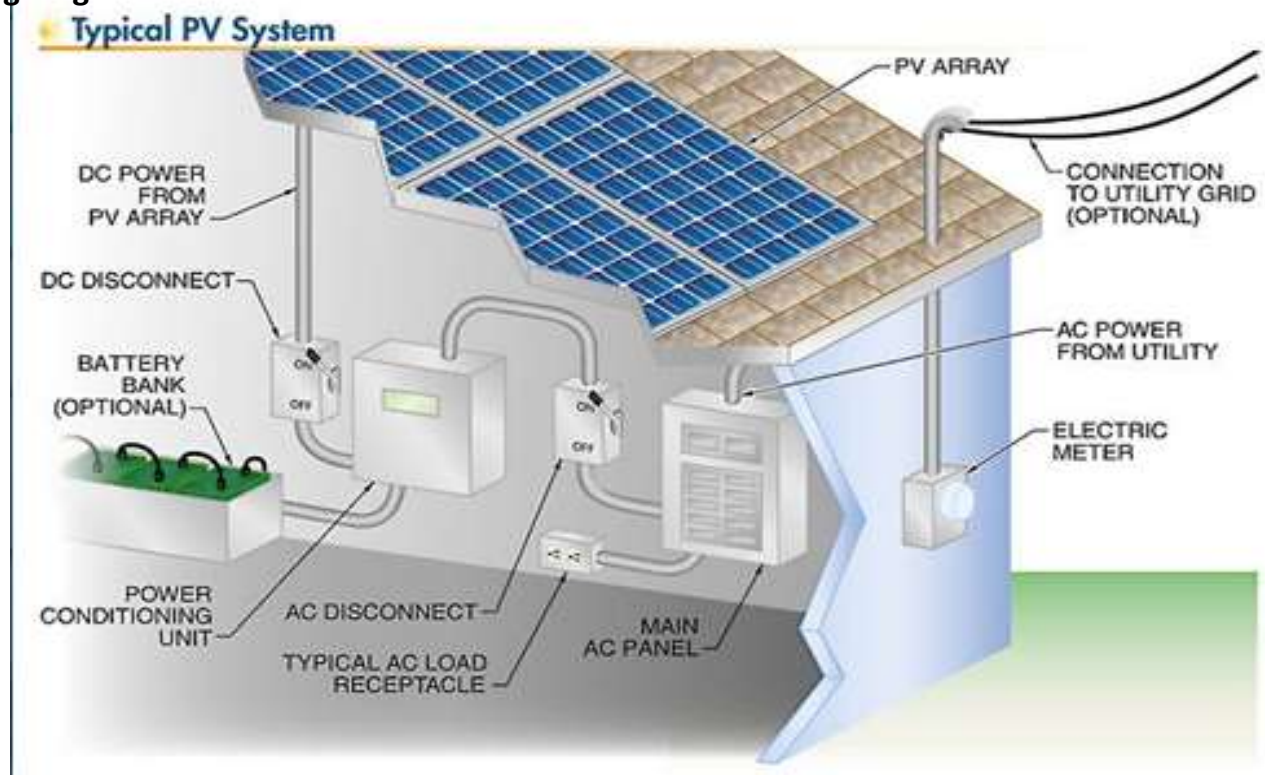
For solar water heating in Chicago, in the summer, one might expect this collector to convert about 17,800 BTU/day.

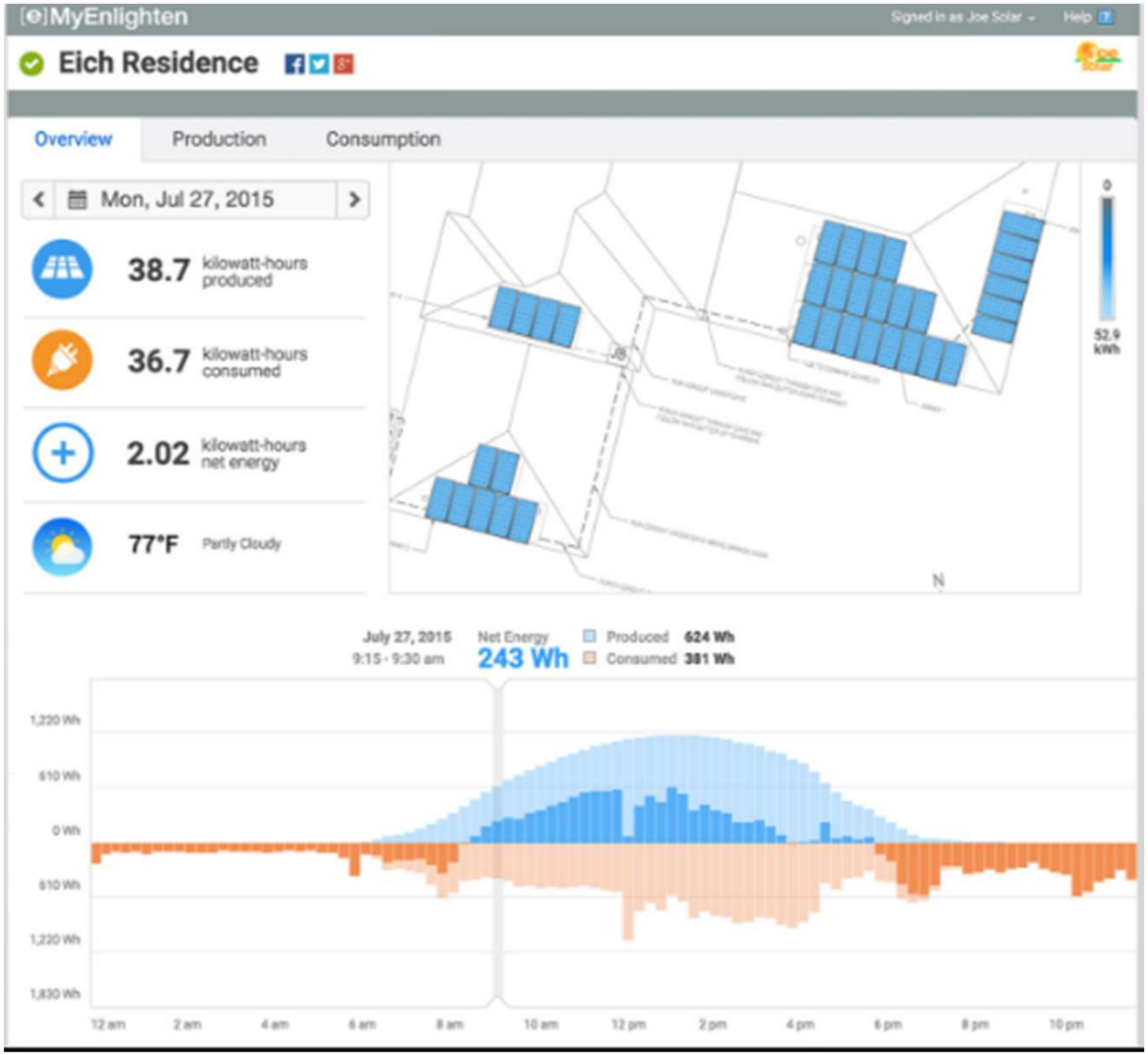
Source: http://www.solar-rating.org/

Introduction To PV Systems

Utility Connected or Grid-tied systems are the most commonly found systems in the market.

Let's see the following diagram:




MyEnlighten
Signed in as Joe Solar
Help
Eich Residence
Overview
Production
Consumption
Mon, Jul 27, 2015
38.7 kilowatt-hours produced
36.7 kilowatt-hours consumed
2.02 kilowatt-hours net energy
77°F Partly Cloudy
0
52.9 kWh
N
July 27, 2015
9:15 - 9:30 am
Net Energy
243 Wh
Produced 624 Wh
Consumed 381 Wh
1,220 Wh
610 Wh
0 Wh
610 Wh
1,220 Wh
1,830 Wh
12 am
2 am
4 am
6 am
8 am
10 am
12 pm
2 pm
4 pm
6 pm
8 pm
10 pm

Tesla Powerwall, Powerpack deployment grows 81% to 415 MWh in Q2

The amount marks a high point for quarterly deployment of the company's energy storage systems and shows that it remains focused on growing that part of its business alongside its electric vehicles.

https://www.utilitydive.com/news/tesla-powerwall-powerpack-deployment-grows-81-to-415-mwh-in-q2/559790/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202019-07-31%20Utility%20Dive%20Load%20Management%20%5Bissue:22198%5D&utm_term=Utility%20Dive:%20Load%20Management

sonnen

Sonnen's mission is to provide clean and affordable energy for all. As the first mainstream grid tied residential energy storage company in the world and with 24,000 sonnenBatterie systems installed worldwide, sonnen is a proven global leader in intelligent energy management solutions. The all-in-one sonnenBatterie smart energy storage solution easily integrates with new and existing solar installations to help homes manage their energy throughout the day-saving money, providing backup power, and maximizing the effective use of solar power day and night. Sonnen has won several awards for its energy innovations, including the 2017 Zayed Future Energy Prize, MIT's Technology Review's 50 Smartest Companies in 2016, Global Cleantech 100 for 2015-2017

LG rolled out new battery products at the 2018 Solar Power International Conference this week in California: a 5 kW AC-coupled system for homes where solar panels are already installed and a 7.6 kW DC-coupled system for new installations. (9/26/2018)

https://www.utilitydive.com/news/as-residential-energy-storage-booms-lg-enters-market-with-expandable-batte/533123/

INSTALLER ACCREDITATION: COMPANIES & INDIVIDUALS
PHOTOVOTAICS, SOLAR THERMAL, SMALL WIND

http://www.nabcep.org/company-accreditation


Good planets are hard to find.

Any questions ???

Need reports, contacts ???

Contact:

Scott Sklar
solarsklar@aol.com

Explore the Residential Program Solution Center

Resources to help improve your program and reach energy efficiency targets:

- Handbooks - explain *why* and *how* to implement specific stages of a program.
- Quick Answers - provide answers and resources for common questions.
- Proven Practices posts - include lessons learned, examples, and helpful tips from successful programs.
- Technology Solutions NEW! - present resources on advanced technologies, **HVAC** & **Heat Pump Water Heaters**, including installation guidance, marketing strategies, & potential savings.

https://rpsc.energy.gov

DOE Health + Home Performance Infographic

- **WHO**: Res EE programs, partners (contractors+)
- **WHAT**: Visual aid, trusted source
- **WHERE**: IRL or digitally
- **WHY**: Most do not get link btw home, health & efficiency
- **CONTRACTORS:** Find qualified networks

Thank You!

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